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THE GLOBAL DISTRIBUTION OF STRATOSPHERIC OZONE FROM OGO-4 BUV OBSERVATIONS

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(NASA-CR-164210) THE GLOBAL DISTRIBUTION OF STRATOSPHERIC OZONE FROM OGO-4 BUV OBSERVATIONS (Colorado Univ.) 7 p HC A02/MF A01 CSCL 04A G3/46 21822 Unclas N81-22633

OGO 4 BUV measurements, from which the global vertical ozone distribution in the stratosphere could be derived, have been made for the period September 1967 to January 1969. The first five months of the data set were processed and the results summarized by London et al. (1977). The basic inversion algorithm, including methods of data handling, have been modified slightly and the entire data set has been reprocessed. Re-analysis shows consistent results with the first five months as published previously and it is of interest to compare some year to year variations from a sample of the full data set.

Latitude-height cross sections of the mass mixing ration are shown for two different years for equinoctial and Northern Hemisphere winter periods (Figs. 1-4). The data represent two week averages for October 1967 and 1968, and for January 1958 and 1969.

For October 1967 the ozone distribution is rather symmetrical about the equator although the values are slightly higher in the Southern Hemisphere (spring) and about 30-35 km. In October 1968 the distribution about the equator is quite symmetrical. The latitudinal variation at levels above about 3 mb (40 km) is small where photochemical processes are dominant in determining the ozone distribution. In 1967 there seems to be a slight increase at these levels towards the poles that might reflect a temperature influence in the ozone chemistry in the upper stratosphere. This apparent increase, however, is absent in 1968.

During both winters there is an increase of ozone from the summer to winter hemispheres but little interannual variation shown between the two Januaries. The deep equatorial minimum indicated in earlier analyses of these data has been reduced as a result of reprocessing the data to minimize the effect of multiple scattering in the inversion procedure. This minimum was absent during the 1st week of January 1969.

An example of the geographic distribution of the ozone mixing ratio in the Northern Hemisphere is shown in Fig. 5 for 6 mb during January 1968. At this level there is a slight ozone maximum in subtropical latitudes, at about 15°N to 25°N. It is seen that even at this height dynamic effects contribute to the geographic ozone variation.

The full 17 months of observations are currently being analyzed to document time and space variations of stratospheric ozone during the

period of OGO-4 measurements.

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London, Julius, John E. Frederick and Gail P. Anderson, Satellite Observations of the Global Distribution of Ozone, J. Geophys. Res., 82, 2543-2556, 20 June 1977.

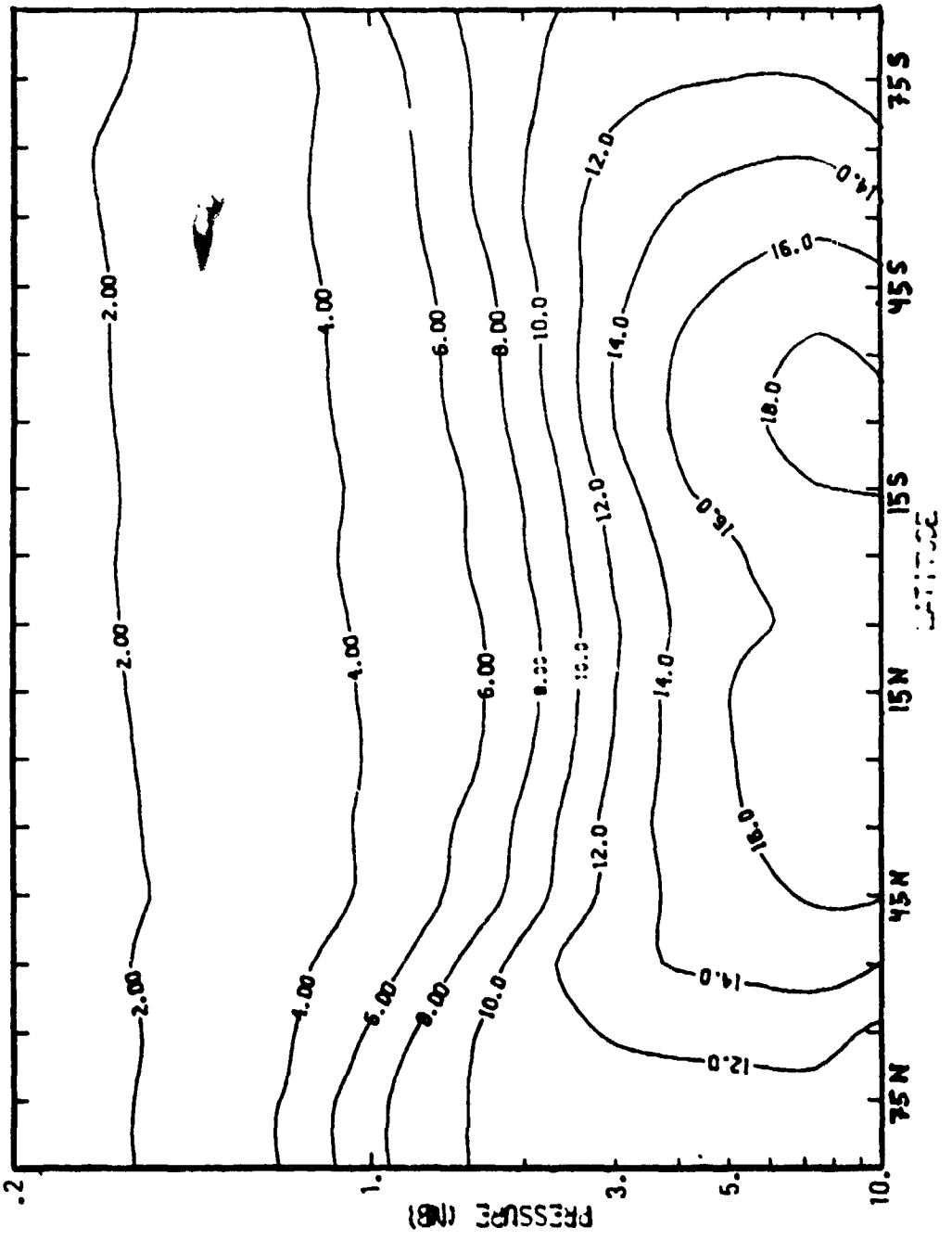


FIG. 1. VERTICAL CROSS SECTION OF OZONE MASS MIXING RATIO [μg/g] AS OBSERVED FROM THE OGO-4 SATELLITE, OCTOBER 1-14, 1967.

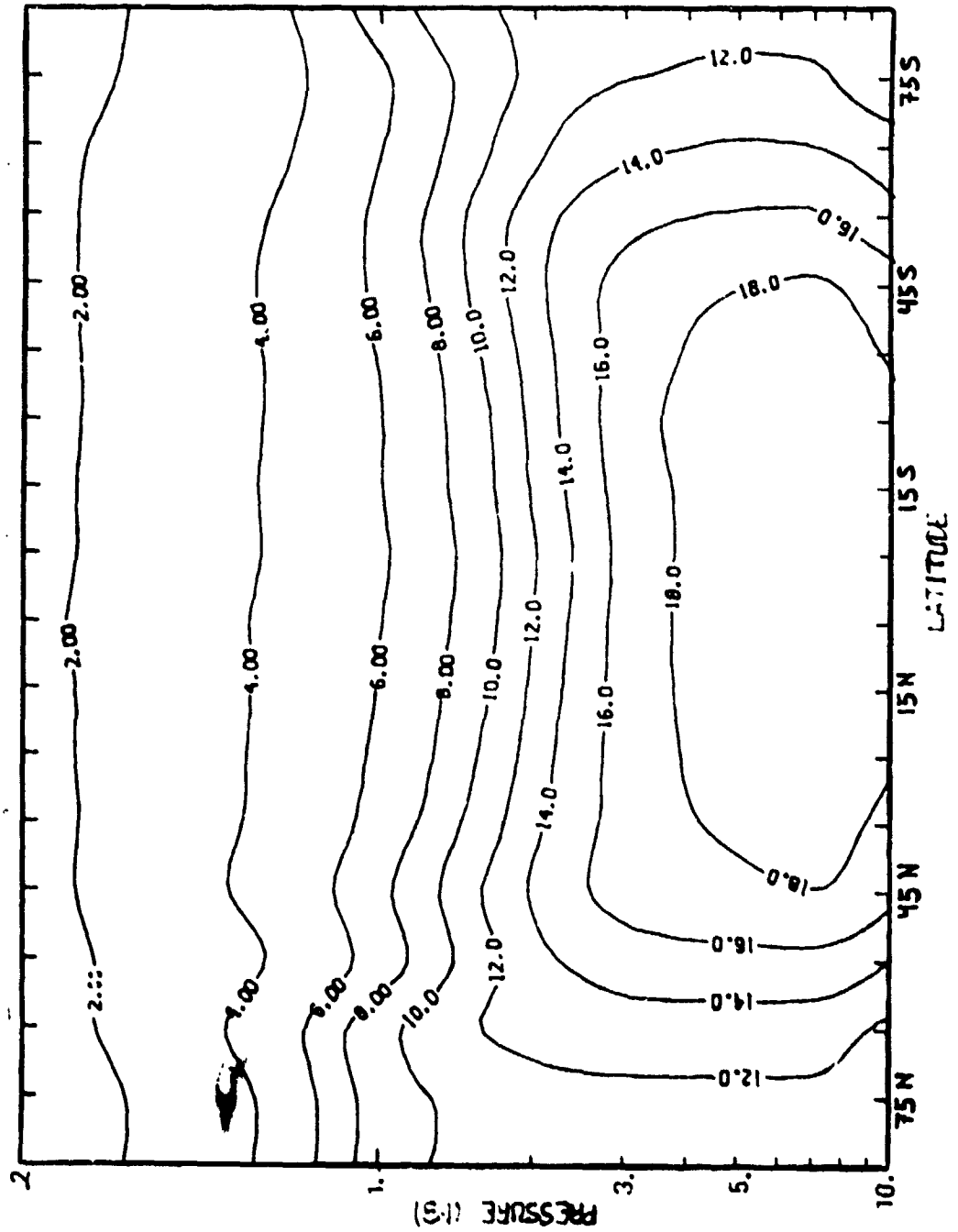
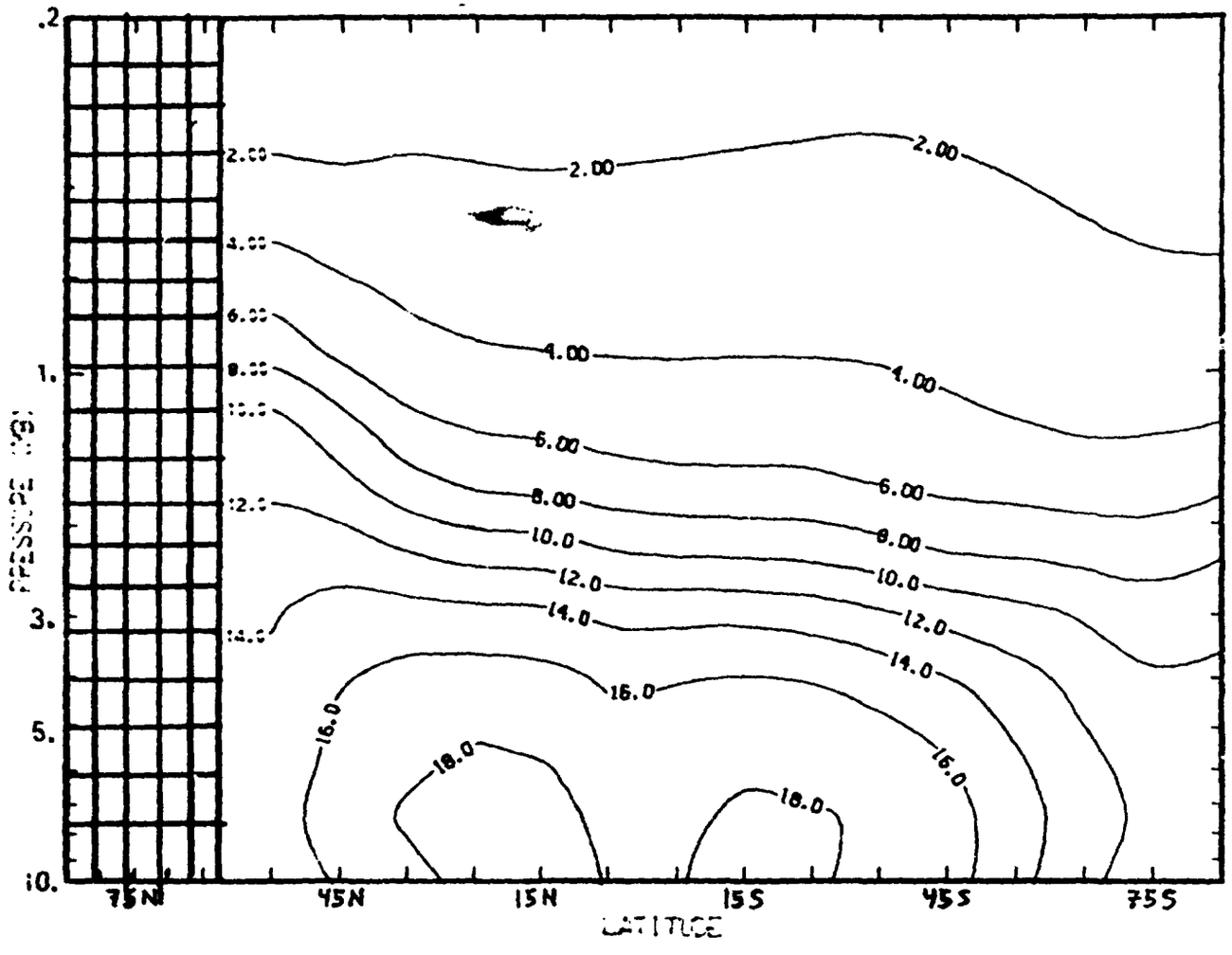


FIG. 2. VERTICAL CROSS SECTION OF OZONE MASS MIXING RATIO [μg/g] AS OBSERVED FROM THE OGO-4 SATELLITE, OCTOBER 1-14, 1968.

FIG. 3. VERTICAL CROSS SECTION OF OZONE MASS MIXING RATIO [μg/g] AS OBSERVED FROM THE OGO-4 SATELLITE, JANUARY 1-14, 1968.



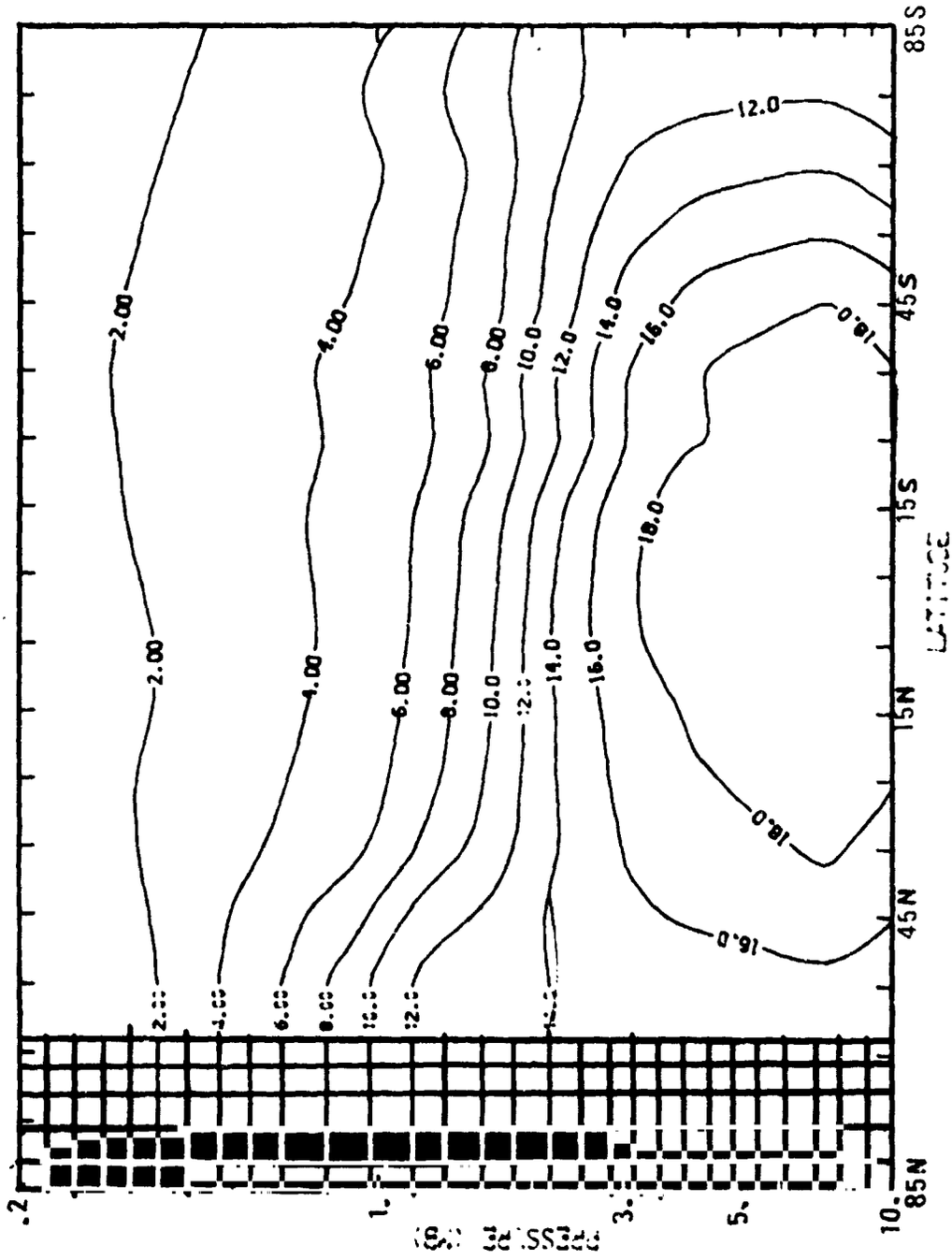


FIG. 4. VERTICAL CROSS SECTION OF OZONE MASS MIXING RATIO [μg/g] AS OBSERVED FROM THE OGO-4 SATELLITE, JANUARY 1-10, 1969.

FIG. 5. THE GEOGRAPHIC DISTRIBUTION OF OZONE MASS MIXING RATIO [μg/g] AT 6.0 MB. FOR JANUARY 1-31, 1968.